

Annex 5

Cover Sheet for Technical Report

All required sections of this Fact Sheet are completed by the author of the report. Once completed, this Fact Sheet should be sent with the report.

TITLE of AGREEMENT	CWR in EURISCO					
AGREEMENT NUMBER	L22ROM178					
IMPLEMENTING PARTNER	Agricultural Research Institute, Ministry of Agriculture, Rural Development and Environment					
AUTHOR OF THE REPORT	Dr Angelos Kyratzis					
DATE SUBMITTED	14/07/2023					
TYPE OF REPORT	Final technical report.					
ABSTRACT (maximum 200 words)	One hundred and seventy-seven crop wild relatives (CWR) were prioritized using the following criteria (1) CWR whose centre of diversity is within Cyprus, the Near East or the Mediterranean (2) CWR of economic importance to Cyprus (3) CWR of economic importance to Europe (4) CWR selected by local experts and plant breeders as being of high importance to their current or future work, and (5) CWR native to Cyprus. Data on population level were retrieved from local genebanks, local herbaria, the literature and on- line databases. In total, 5206 populations were identified representing the 177 taxa. From the georeferenced populations, 815 (15.66% of the recorded populations) were within protected areas representing 136 of the 177 taxa. Further criteria were applied for the final selection of the populations to be uploaded to EURISCO. The selection criteria included; populations grown in areas under the effective control of the Government of Cyprus, accuracy of the georeferenced data, year of recording; distance between populations; distribution of the populations. Finally, 391 (47.98% of the populations within protected areas) were selected for inclusion to EURISCO representing 130 of the 177 taxa. Data are ready to be uploaded to EURISCO.					
KEYWORDS	Country/region: Cyprus Subject: CWR in EURISCO – Final Technical Report					





Final Technical Report

The agreement between the Agricultural Research Institute, Ministry of Agriculture, Rural Development and Environment and the ECPGR secretary was signed at the 13th of October 2022. The first activity according to the work plan was the identification of priority taxa and populations.

Identification of Priority Taxa

The development of a national Crop Wild Relatives (CWR) conservation strategy for Cyprus was recently carried out (Philips et al., 2014) in collaboration with the University of Birmingham. From an initial checklist of 1,722 Cypriot CWR taxa, 178 CWR were prioritized using the following criteria (1) CWR whose centre of diversity is within Cyprus, the Near East or the Mediterranean (2) CWR of economic importance to Cyprus (FAO 2012) (3) CWR of economic importance to Europe (FAO 2012) (4) CWR selected by local experts and plant breeders as being of high importance to their current or future work, and (5) CWR native to Cyprus (Hand et al. 2011). The 178 CWR taxa were used for the purposes of the current project. Nomenclature of the selected taxa was updated according to the latest developments following the online flora of Cyprus, a dynamic check list (Hand et al. 2011). The updating resulted to the deletion of some taxa and the addition of three taxa of the genus Beta (Beta adanensis, Beta lomatogona, Beta macrocarpa). The final taxon list with the descriptors listed to the Annex 1 - Descriptors recommended for the generation of a National Inventory of in situ Crop Wild Relatives - Taxon level information, of the document "Principles for the Inclusion of CWR Data in EURISCO" is attached. The final list contains 177 taxa representing six families. Most taxa belonged to families Fabaceae, and Poaceae (Table 1). Genus Trifolium is represented by the highest number of taxa (34) followed by the genera Vicia (21), Medicago (21) and Allium (17).

Families and Genera	No. of taxa	Families and Genera	No. of taxa
Amaryllidaceae	17	Medicago	21
Allium	17	Melilotus	2
Asteraceae	7	Pisum	1
Astartoseris	1	Trifolium	34
Lactuca	6	Vicia	21
Brassicaceae	12	Poaceae	43
Brassica	3	Aegilops	9
Crambe	1	Agrostis	1
Diplotaxis	1	Avena	8
Eruca	1	Crithopis	1
Lepidium	4	Dactylis	1
Sinapis	2	Elymus	4
Chenopodiaceae	4	Hordeum	7
Beta	4	Lolium	5
Fabaceae	94	Phalaris	1
Lathyrus	11	Роа	4
Lens	3	Taeniatherum	2
Lupinus	1	Grand Total	177

Table 1.: Number of taxa per family and genus.





Twenty-one of the selected taxa are consider as threatened according to the Red Data Book of the Flora of Cyprus (Tsintides et al. 2007). The respective number per threat category are: two -Critically Endangered, four - Endangered, ten - Vulnerable, one - Near Threatened, one Least Concern and three – Data Deficient. One taxon is listed to the Annex II of the Habitat Directive. Most taxa are considered cosmopolitan (168), six are national endemics and three are regional endemics. Information regarding the descriptors TAXONID, RELATEDCROP and GENEPOOL were retrieved by GRIN GLOBAL-U.S. National Plant Germplasm System (https://npgsweb.arsgrin.gov/gringlobal/taxon/taxonomysearchcwr). Based on the available information, 22 of selected taxa belonged to Gene pool 1, 20 to Gene pool 2 and 56 to Gene pool 3.

Preparation of the national database structure and Organization of the network of data providers

Data on population level used in the development of the national strategy (Philips et al., 2014) constituted the basis for the current project. The dataset with the population data was amended incorporating the data acquired over the last years and the descriptors needed to be taking into consideration for the construction of the national inventory. Data were retrieved from local genebanks, local herbaria, the literature and on-line databases (**Table 2**). Local genebanks and herbaria included the genebank and the herbarium of the Agricultural Research Institute, the Herbarium of the Department of Forests, the genebank of a private University (Nature Conservation Unit – Frederic University) and a private Herbarium (Dr George Hadjikyriacou). On-line databases included European Search Catalogue for Plant Genetic Resources (EURISCO), Global Biodiversity Information Facility (GBIF), Genesys and ENSCOBASE (ENSCONET Virtual Seed Bank).

Source of Information	Recorded populations	Georeferenced populations within protected area	Selected populations for inclusion to EURISCO	Selected populations for inclusion to EURISCO/ Recorded populations (%)
Literature	167	20	2	1.20
Local genebanks	1088	300	208	19.12
Local herbaria	1647	264	142	8.62
On line databases	2273	231	39	1.72

Table 2.: Source of Information on population level for the selected taxa

The Department of Forests and the Department of Environment of the Ministry of Agricultural, Rural Development and Environment were consulted and endorsed the list of the selected taxa. They also approved the nomination of Agricultural Research Institute as a liaison institute between providers and potential users. The Scientific Committee for the Regulation of Access to Genetic Resources established under the Law (N. 49(1)/2018) decided that the selected populations will be accessed according to the terms and conditions of the Multilateral System of the International Treaty of Plant Genetic Resources for Food and Agriculture with the exception of endemic and threatened taxa that are not listed to Annex I of the Treaty.



Collect and organize the data according to the agreed principles and data exchange format

In total, 5206 populations were identified representing the 177 taxa (**Annex I**). Most of the populations belonged to families *Fabaceae* and *Poaceae* (**Figure 1a**). The main source of information were the on-line databases, followed by local herbaria and genebanks (**Table 2**).

Figure 1. Number of populations per family from all recorded populations (a), from georeferenced populations within protected areas (b) and from selected populations for inclusion to EURISCO (c)



The majority of the recorded populations (3289 – 63.18%) had georeferenced data (**Figure 2**). From the georeferenced populations, 815 (15.66% of the recorded populations) were within protected areas representing 136 of the 177 taxa (**Annex I**). The number of populations per family is shown to **Figure 1b** and their distribution to **Figure 3**. Protected areas were considered those that are declared and managed according to the National Laws (N. 153(I)/2003 and N. 152(I)/2003) implementing EU Directives for NATURA 2000 network (1992/43/EC and 2009/147/EC) (Sites of Community Importance - SCI, Special Protection Areas - SPA) and the Forest Law (N. 25(I)/2012) (State Forests – National Forest Parks, Nature Reserves, Communal and Municipal Forests).



Figure 2. Distribution of georeferenced populations



Figure 3. Distribution of georeferenced populations within protected areas. Different colours represent protected areas with different legal status.



Further criteria were applied for the final selection of the populations to be uploaded to EURISCO. The selection criteria included; populations grown in areas under the effective control of the Government of Cyprus, accuracy of the georeferenced data, year of recording; distance between populations; distribution of the populations. In case of populations of close proximity, only one population was selected. Recently recorded populations were preferred (**Figure 5**). In case of taxa with wide distribution, populations were selected to represent different climatic conditions. As an example, **Figure 6** shows the selection of the populations of the taxon *Lactuca serriola*. From the 24 recorded populations within protected areas, only ten were selected based on the proximity of the populations and their distribution.



Figure 5. Observation year of the selected populations for inclusion to EURISCO.

* Populations with unknown observation year



Figure 6. Distribution of the recorded populations of the taxon *Lactuca serriola* within protected areas (empty circles). Selected populations for the inclusion to EURISCO are shown with filled gray circles. Different colours represent protected areas with different legal status.



Finally, 391 (7.51% of the recorded populations and 47.98% of the populations within protected areas) were selected for inclusion to EURISCO representing 130 of the 177 taxa (**Annex I**). The number of populations per family is shown to **Figure 1c** and their distribution to **Figure 7**.

Figure 7. Distribution of the selected populations for inclusion to EURISCO. Different colours represent protected areas with different legal status.





The source of information for the majority of the selected populations for the inclusion to EURISCO were from local genebanks (208/391 populations - 19.12% of the recorded populations) and local herbaria (142/391 populations – 8.62% of the recorded populations) (**Table 2**).

The National Inventory was constructed following the guidelines of Annex 1 - Descriptors recommended for the generation of a National Inventory of *in situ* Crop Wild Relatives - Accession/population-level information of the document "Principles for the Inclusion of CWR Data in EURISCO". The National Inventory contains information for all descriptors except PUID, CONSACTION, COORDUNCERT, SITEPROT and LINKS.

Provide the data to EURISCO

The excel file containing information of the selected populations according to EURISCO descriptors following the guidelines of Annex 2 - Descriptors for uploading passport data of *in situ* CWR to EURISCO of the document "Principles for the Inclusion of CWR Data in EURISCO" is attached. The data were not uploaded to EURISCO because the interface for the uploading of the data is not yet available.

References

Hand R., Hadjikyriakou G. N. & Christodoulou C. S. (ed.) 2011– (continuously updated): Flora of Cyprus – a dynamic checklist. Published at http://www.flora-of-cyprus.eu/;

Phillips, J., Kyratzis, A., Christoudoulou, C. et al. Development of a national crop wild relative conservation strategy for Cyprus. Genet Resour Crop Evol 61, 817–827 (2014). https://doi.org/10.1007/s10722-013-0076-z

Habitats Directive (1992). Council of the European Community Directive 92/43/CEE (1992) on the Conservation of Natural Habitats and of Wild Fauna and Flora.

Tsintides, T., Christodoulou, C. S., Delipetrou, P.& Georghiou, K. (eds) (2007). The Red Data Book of the flora of Cyprus. Cyprus Forestry Association, Lefkosia.



Annex I.: Number of recorded populations, georeferenced populations within protected areas and selected populations for inclusion to EURISCO per genus and taxon.

Genus	Species	Recorded populations	Georeferenced populations within protected area	Selected populations for inclusion to EURISCO	Georeferenced populations within protected area / Recorded populations (%)	Selected populations for inclusion to EURISCO/ Recorded populations (%)	Selected populations for inclusion to EURISCO / Georeferenced populations within protected area (%)
Aegilops		833	162	40	19.45	4.80	24.69
	bicornis	57	9	2			
	subsp.biuncialis	208	44	13			
	subsp.comosa	5					
	cylindrica	6	3	1			
	geniculata	185	25	9			
	kotschyi	6	1				
	peregrina	147	19	6			
	triuncialis	218	61	9			
	ventricosa	1					
Agrostis		11	3	0	27.27	0.00	0.00
	stolonifera	11	3				
Allium		223	39	24	17.49	10.76	61.54
	amethystinum	7	1	1			
	ampeloprasum	27	4	2			
	cassium	8	2	1			
	subsp.cyprium	8	1	1			
	curtum	19	6	4			
	dentiferum	2					
	exaltatum	2	2	2			
	subsp.guttatum	11	3	3			
	subsp.tenorei	2					
	junceum	25	3	3			
	marathasicum	5					
	neapolitanum	37	8	2			
	pallens	3					
	roseum	2	1				
	subsp.rotundum	3	1	1			
	subsp.sphaerocephalon	15					
	trifoliatum	47	7	4			
Astartoseris		11	9	4	81.82	36.36	44.44
	triquetra	11	9	4			
Avena		184	43	27	23.37	14.67	62.79
	subsp.barbata	42	7	3			
	subsp.wiestii	6	2	2			
	byzantina	1					



1	eriantha	30	6	5			
	hirtula	9	6	4			
	subsp.ludoviciana	2					
	subsp.sterilis	59	8	5			
-	ventricosa	35	14	8			
Beta		215	12	6	5.58	2.79	50.00
	subsp.maritima	197	11	5			
-	adanensis	9					
	lomatogona	2	1	1			
	macrocarpa	7					
Brassica		36	6	1	16.67	2.78	16.67
	hilarionis	9	2				
	nigra	5					
	tournefortii	22	4	1			
Crambe		8	5	1	62.50	12.50	20.00
	hispanica	8	5	1			
Crithopis		10	6	2	60.00	20.00	33.33
	delileana	10	6	2			
Dactylis		51	6	3	11.76	5.88	50.00
	subsp.hispanica	51	6	3			
Diplotaxis		7	0	0	0.00	0.00	0.00
	viminea	7					
Elymus		14	4	2	28.57	14.29	50.00
	subsp.haifensis	3					
	farctus	3					
	panormitanus	3	2	1			
	repens	5	2	1			
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		orbicularis	99	3	2			



	polymorpha	310	23	10			
	praecox	31	4	2			
	rigidula	55	5	3			
	rotata	5	1	1			
	rugosa	10					
	scutellata	72	2	2			
	truncatula	282	6	3			
	turbinata	84	5	3			
Melilotus		33	10	3	30.30	9.09	30.00
	albus	12					
	sulcatus	21	10	3			
Phalaris		15	1	0	6.67	0.00	0.00
	aquatica	15	1				
Pisum		25	3	3	12.00	12.00	100.00
	subsp.biflorum	25	3	3			
Poa		11	1	1	9.09	9.09	100.00
	annua	2					
	compressa	1					
	pratensis	6	1	1			
	trivialis	2					
Sinapis		27	3	3	11.11	11.11	100.00
	alba	14	1	1			
		12	2	2			
	arvensis	15	Z	2			
Taeniatherum		13	4	4	25.00	25.00	100.00
Taeniatherum	subsp.asperum	13 16 7	2 4 2	2 4 2	25.00	25.00	100.00
Taeniatherum	subsp.crinitum	15 16 7 9	2 4 2 2	2 4 2 2	25.00	25.00	100.00
Taeniatherum Trifolium	subsp.crinitum	13 16 7 9 847	2 4 2 2 171	2 4 2 2 101	25.00	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium	13 16 7 9 847 60	2 4 2 2 171 12	2 4 2 2 101 6	25.00	25.00	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum	13 16 7 9 847 60 7	2 4 2 2 171 12 4	2 4 2 2 101 6 3	25.00	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense	13 16 7 9 847 60 7 38	2 4 2 2 171 12 4 10	2 4 2 2 101 6 3 6	25.00 20.19	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri	13 16 7 9 847 60 7 38 16	2 4 2 2 171 12 4 10 5	2 4 2 2 101 6 3 6 4	25.00	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre	13 16 7 9 847 60 7 38 16 77	2 4 2 2 171 12 4 10 5 21	2 4 2 2 101 6 3 6 4 10	25.00	25.00	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri	15 16 7 9 847 60 7 38 16 77 155	2 4 2 2 171 12 4 10 5 21 20	2 4 2 2 101 6 3 6 4 4 10 10	25.00 20.19	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum	15 16 7 9 847 60 7 38 16 77 155 29	2 4 2 2 171 12 4 10 5 21 20 8	2 4 2 2 101 6 3 6 4 10 10 10 3	25.00 20.19	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum	13 16 7 9 847 60 7 38 16 77 155 29 33	2 4 2 2 171 12 4 10 5 21 20 8 4 4	2 4 2 2 101 6 3 6 4 10 10 10 3 3 3	25.00 20.19	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium	13 16 7 9 847 60 7 38 16 77 155 29 33 6	2 4 2 2 171 12 4 10 5 21 20 8 4 4	2 4 2 2 101 6 3 6 4 10 10 10 3 3 3	25.00 20.19 20.19	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium echinatum	13 16 7 9 847 60 7 38 16 77 155 29 33 6 9	2 4 2 2 171 12 4 10 5 21 20 8 4 4 20 8 4 2	2 4 2 2 101 6 3 6 4 10 10 10 3 3 3 1	25.00 20.19	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium echinatum subsp.bonannii	13 16 7 9 847 60 7 38 16 77 155 29 33 6 9 5	2 4 2 2 171 12 4 10 5 21 20 8 4 4 20 8 4 2	2 4 2 101 6 3 6 4 10 10 3 3 1	25.00 20.19 20.19	25.00 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium echinatum subsp.bonannii subsp.fragiferum	13 16 7 9 847 60 7 38 16 77 155 29 33 6 9 5 4	2 4 2 2 171 12 4 10 5 21 20 8 4 4 20 8 4	2 4 2 101 6 3 6 4 10 10 3 3 10 10 10 10 10	25.00 20.19 20.19	25.00 11.92	100.00 59.06
Taeniatherum Trifolium Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium echinatum subsp.bonannii subsp.fragiferum globosum	13 16 7 9 847 60 7 38 16 77 155 29 33 6 9 5 4	2 4 2 2 171 12 4 10 5 21 20 8 4 20 8 4 20 8 4 20 2 2 2 2 2 1 20 3 8 4 1	2 4 2 2 101 6 3 6 4 10 10 3 3 3 3 1 1	25.00 20.19 20.19	25.00 11.92 11.92	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium echinatum subsp.bonannii subsp.fragiferum globosum glomeratum	13 16 7 9 847 60 7 38 16 77 155 29 33 6 9 5 4 8	2 4 2 2 171 12 4 10 5 21 20 8 4 20 8 4 4 20 8 4 2 2 2 1 20 3	2 4 2 2 101 6 3 6 4 10 10 10 3 3 3 3 1 1 1 1 2	25.00 20.19 20.19	25.00 11.92 11.92	100.00
Taeniatherum Trifolium Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium echinatum subsp.bonannii subsp.fragiferum globosum glomeratum	13 16 7 9 847 60 7 38 16 77 155 29 33 6 9 5 4 8 3	2 4 2 2 171 12 4 10 5 21 20 8 4 20 8 4 4 20 8 4 20 2 2 1 20 3 3	2 4 2 2 101 6 3 6 4 10 10 10 3 3 3 3 1 1 1 1 2	25.00 20.19 20.19	25.00	100.00 59.06
Taeniatherum Trifolium	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium echinatum subsp.bonannii subsp.fragiferum globosum glomeratum grandiflorum hirtum	13 16 7 9 847 60 7 38 16 77 155 29 33 6 9 5 4 8 3 46	2 4 2 2 171 12 4 10 5 21 20 8 4 20 8 4 4 20 8 4 20 8 4 1 20 8 1 20 3 1 1 3	2 4 2 2 101 6 3 6 4 10 10 3 3 3 3 3 1 1 1 2 1 2 7	25.00 20.19 20.19	25.00 11.92 11.92	100.00
Taeniatherum Image: Trifolium Image: Trifolium <th>arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium echinatum subsp.bonannii subsp.fragiferum globosum glomeratum grandiflorum hirtum lappaceum</th> <th>15 16 7 9 847 60 7 38 16 77 155 29 33 6 9 5 4 8 3 46 8</th> <th>2 4 2 2 171 12 4 10 5 21 20 8 4 20 8 4 20 8 4 20 20 8 4 1 20 1 20 1 3 1 1 3</th> <th>2 2 101 6 3 6 4 10 10 3 3 1 1 2 1 2 7</th> <th>25.00 20.19 20.19</th> <th>25.00 25.00 11.92</th> <th></th>	arvensis subsp.asperum subsp.crinitum angustifolium argutum arvense boissieri subsp.campestre cherleri clypeatum dasyurum dubium echinatum subsp.bonannii subsp.fragiferum globosum glomeratum grandiflorum hirtum lappaceum	15 16 7 9 847 60 7 38 16 77 155 29 33 6 9 5 4 8 3 46 8	2 4 2 2 171 12 4 10 5 21 20 8 4 20 8 4 20 8 4 20 20 8 4 1 20 1 20 1 3 1 1 3	2 2 101 6 3 6 4 10 10 3 3 1 1 2 1 2 7	25.00 20.19 20.19	25.00 25.00 11.92	



	subsp.eriocarpa	11	2	1			
	pubescens	7	1	1			
	peregrina	28	8	5			
	parviflora	2	1	1			
	pannonica	2					
	palaestina	3	1	1			
	narbonensis	19	3	2			
	subsp.monantha	9	2	2			
	lutea	1	1	1			
	lathyroides	7	1	1			
	hybrida	48	7	3			
	hirsuta	2					
	ervilia	86	2	1			
	dalmatica	10					
	cypria	8	2	1			
	cretica	9	2	2			
	cassia	12	1	1			
	bithynica	8	1	1			
	assyriaca	1					
	angustifolia	43	3	1			
	amphicarpa	3					
Vicia		319	38	25	11.91	7.84	65.79
	tomentosum	40	9	5			
	suffocatum	5					
	subsp.subterraneum	54	5	4			
	subsp.oxaloides	2	2	1			
	striatum	2	1	1			
	stellatum	53	11	5			
	spumosum	23	2	2			
	scutatum	10	3	3			
	scabrum	31	10	8			
	resupinatum	21	1	1			
	repens	4					
	pratense	1					
	pilulare	23	5	2			
	physodes	10	3	1			
	pamphylicum	33	12	8			
	subsp.petrisavii	20	4	3			
	leucanthum	7	1	1			

Alliance



